

brane. This is replaced later by more or less granulation tissue, and ultimately the anterior pillar largely, if not entirely, fades away into the lateral wall. No undesirable vocal effects have been noted. The verdict of singers has been that the resulting voice is "bigger." If the posterior pillar were lacerated, the resulting cicatrices might be deleterious, but the writer has been fortunate enough to escape inflicting such injuries.

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CHVOSTEK'S SIGN AND ITS SIGNIFICANCE IN OLDER CHILDREN.

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In 1876 Chvostek, of Vienna, described a sign which he believed was characteristic of tetany. The sign, which since that time has been called Chvostek's sign, or the facial phenomenon, consists in an easily demonstrated mechanical excitability of the peripheral nerves. By tapping either with the finger or a percussion hammer on the skin over the facial nerve, that is, at a point about midway between the zygoma and the angle of the mouth, one obtains when the sign is present, a lightning-like contraction of the muscles supplied by the facial nerve; the angle of the mouth, the side of the nose, and in marked cases the skin over the inner canthus of the eye and eyebrow display a sudden twitching.

There has been some dispute as to the cause of the twitching, some authorities claiming that it was due to a spinal reflex, others that it was merely a heightened irritability of the nerve trunk. Escherich,¹ in a rather ingenious manner, adds weight to the latter hypothesis by the following experiment: By applying a 10 per cent. cocaine solution to the skin, then using kataphoresis, he anesthetizes the skin over the cheek; on tapping this area the phenomenon nevertheless remains positive. On the other hand when the skin over the inner surface of the thigh is thus anesthetized the cremasteric reflex cannot be obtained. He therefore is inclined to disregard the reflex theory and to consider the twitching due to direct stimulation of the overexcitable facial nerve trunk.

At first it was supposed that this symptom was present only

¹ Die Tetanie der Kinder, Vienna, 1909.

in individuals suffering from tetany, and indeed to this day it is universally regarded as one of the three cardinal signs of that disease, the other two being Trousseau's and Erb's. Chvostek's sign is so easily elicited and so characteristic that it has been tried for in many varied conditions exclusive of tetany, and numerous observers have found it present in conditions which seem to have nothing at all to do with that disease. Not only is the constancy of the sign questioned, but the degree to which the face twitches has been interpreted as being of varied importance. Schlesinger² divided the phenomenon into three grades, designated types 1, 2, and 3, according as the twitching was confined to the scarlet border of the lip, the side of the nose, or the entire side of the face. All the observers, including Chvostek, attach little or no importance to the twitching of the scarlet border of the lip alone. The most marked facial twitching, that is, type 3, is by many conceded to be present only in tetany. It is only in tetany also that the so-called Schultz phenomenon is observed, that is, where there is such increased excitability of the nerve that by merely lightly stroking the skin a distinct facial twitching may be obtained.

It is rather difficult to gather statistics about this subject from the literature, for (1) there is no unanimity as to the method of classifying the types of the reaction, (2) most of the work has been done on adults, and (3) we are not yet sure whether infantile and adult tetany are identical, especially since what is generally conceded to be a criterion in infants, that is to say, Erb's electrical reaction, has not been sufficiently investigated in young adults for one to know the positive normal figures. The occurrence of the sign during infancy, however, has been usually considered as positive evidence of tetany, although the electrical reaction (heightened galvanic irritability) is a more delicate test, and often shows latent tetany when Chvostek's sign is negative. The sign has been found positive by German investigators especially frequently in older children, and these positive cases have been variously interpreted as latent tetany, as cases of neuropathic diathesis, or the positive sign has been considered simply as a chance find of no diagnostic significance whatever.

In view of the fact that tetany occurs more rarely in America than in Europe, and especially than in Austria, where most of the previous investigations along this line have been carried out, it seemed of interest to obtain figures concerning the occurrence of the facial phenomenon in children attending American clinics, for it seemed logical to conclude that if the phenomenon was positive in as large a number of cases here as abroad, where the distribution of tetany is so different, the isolated facial phenomenon would seem to have no dependence on present or previously existing tetany.

² *Zeitschr. f. klin. Med.*, 1891, xix, 487; *Wien. klin. Woch.*, 1910, p. 315.

Among the observers who believe the sign to be pathognomonic of tetany is Chvostek, Jr.,² of Vienna. From time to time in the past few years he has published numerous studies on the subject, and especially in an article published in 1907,⁴ lays great stress on the importance of the sign. In 840 cases of illness in adults only 6 cases had a positive facial of type 2 or 3, in which no sign or history of tetany could be obtained. In all the other cases in which it was present, distinct signs of tetany manifest or latent were found. The more intense the degree of facial present the more likely was the case to be one of tetany. Chvostek concludes his article as follows: "We believe that the mechanical hyperexcitability of the nerves, especially the facial, is an easily elicited and important symptom of diseases of the parathyroids, a delicate test which reveals to us a disturbance in the functions of these organs."

Frankl-Hochwart,⁵ writing on tetany in Nothnagel's *System*, does not go so far as this. He believes that the isolated facial phenomenon (by which is understood a positive Chvostek's sign without any other sign of tetany) may at times mean tetany; but that there are surely many cases in which it has nothing at all to do with that disease. However, he brings out an interesting point which connects the sign more intimately with tetany, namely, that in those years in which tetany was epidemic in Vienna there appeared in persons ill with other diseases, a much greater number of positive facials, and conversely in those years in which there was little tetany to be seen in Vienna, few patients suffering from other diseases showed the sign. Furthermore, to show the connection between the facial and tetany, he examined a series of cases of tetany a number of years after the attack, with the following results: In chronic and relapsing cases Chvostek's sign was present in every instance (7 cases); in 19 cases where only paresthesias remained the sign was absent only five times; in 6 cases which had lost all symptoms but general debility and weakness it was present twice; in those cases which were entirely cured, 5 in number, the sign was negative in all.

In 1891 Loos,⁶ in Vienna, came to the conclusion after the examination of a large number of cases that the sign was present not only in tetany but in many other diseases as well, and that it was frequently found positive in hysterical and nervous children. He describes 80 children with positive facial phenomena, but without any other signs of tetany. The children were suffering from various diseases and did not show hyperirritability of any other muscle groups. He concludes that: (1) The positive sign in some cases is an

² Wien. klin. Woch., 1905, No. 38; Deut. med. Woch., 1909, p. 825; Zeitschr. f. klin. Med., 1891, xix, 489.

⁴ Wien. klin. Woch., 1907, No. 17.

⁶ Wien. klin. Woch., 1891, No. 49.

⁵ Tetanie, in Nothnagel's *System*.

expression of general disturbance of nutrition. (2) It may be present in a number of members of the same family, where it is an expression of a heightened irritability of the nervous system. (3) It may be present in tetany.

Oscar Herbst,⁷ in Berlin, in 1910, published an examination of 500 school children, among whom he found the sign most often in the fourteenth year. It was present in 43 per cent. of the children, and was marked in 18 per cent. He does not attach much importance to the sign.

Sperk,⁸ also writing in 1910, concludes that the isolated facial is rare in infancy, and that it increases rapidly from the fifth to the fourteenth year. He also points out that the sign when present in older children occurs in nervous individuals who have increased knee-jerks and diminished corneal and pharyngeal reflexes. He believes that it is a helpful sign when found in conjunction with others in making the diagnosis of a neuropathic child.

Thiemich,⁹ on the other hand, is opposed to this view and clings to the belief that the sign is pathognomonic of tetany even when present in older children without any other signs. He has observed a number of children who showed the sign in infancy when they had typical tetany. The sign then disappeared, to return again later on, after the fifth year, without being accompanied by any other manifestations of tetany. His conclusions read: "The facial must be stricken from the list of nervous stigmas and must be regarded even in late childhood as a pathognomonic sign of latent tetany, even if this disease remains continuously a symptomless anomaly of the nervous system."

Lust,¹⁰ in 1911, before describing a new sign which he believes is present in 97 per cent. of cases of spasmophilia, that is, eversion of the feet when the skin is tapped upon over the external popliteal nerve as it winds around the head of the fibula, summarizes the various viewpoints concerning the significance of Chvostek's sign. He concludes that in infancy its occurrence has a distinctly pathological significance, that it means tetany, but that it is present in only about 50 per cent. of cases of this disease. He examined 40 spasmophilic children of all ages and found the sign present in 45 per cent. and absent in 55 per cent. Of the babies, 34 in number, 15 had positive facials (44 per cent.) and 19 had none (55.9 per cent.). An absent facial in infants does not exclude spasmophilia, for in latent tetany as the child improves the sign disappears before the electrical reaction becomes normal.

The latest contribution on the subject is by Hochsinger.¹¹ He has examined all the children of his private practice for many

⁷ Deut. med. Woch., 1910, No. 12.

⁸ Wien. klin. Woch., 1910, No. 5.

⁹ Monats. f. Kinderheilkunde, 1902, No. 3: Tetany, in Pfaundler and Schlossman's System.

¹⁰ Munch. med. Woch., August 8, 1911.

¹¹ Wien. klin. Woch., October 26, 1911.

years past, for the presence of this symptom, and comes to the conclusion that apart from its significance in tetany it is useful as a sign of a neuropathic constitution in childhood. He finds Chvostek's sign frequently present in the mothers, less often in the fathers of the children showing it, thus emphasizing the hereditary character of nervous stigmata. Of 117 children showing symptoms of nervousness, 101 showed the sign, 26 of these were generally nervous, without any special symptoms, the other 75 showed pavor nocturnus, migraine, nervous anorexia, enuresis, etc. Of the mothers of these children 61 showed positive facials. The sign disappears in boys at about the sixteenth year; in girls, on the other hand, it may remain to the thirtieth year, frequently not disappearing until the menopause. The sign may disappear in summer to return again during the cold weather. When present in normal children he could always find neurotic antecedents. His conclusions are: "The isolated facial in older children has in all cases a pathological significance. The facial is one of the chief symptoms of over-excitability and nervousness in youth, and seems to be more deeply rooted in the female than in the male sex. Juvenile nervousness and infantile hyperexcitability (that is, spasmophilia of infants); belong genetically together, and depend ultimately on hereditary neuropathic tendencies."

During the past summer I noted that in older children applying for treatment at my clinic at Mt. Sinai Hospital Dispensary the presence of this sign was by no means a rare occurrence, and therefore in the months of September, October, November, and December every new case was tested for the presence or the absence of the sign. In all 495 children, ranging in ages up to fourteen years, were examined. It was positive in 16 of these cases, that is, 3.2 per cent. The percentage at the different ages can be seen in Table I. It will be noted that the sign is present only in 1 per cent. of the children aged under three years, and then becomes gradually more frequent until it reaches 19.6 per cent. in children aged ten to fourteen years. These figures agree fairly well with those found by German observers.

TABLE I.—Ages at which Chvostek's Sign was Found in Examining 495 Children. Sixteen Positive Cases.

Age.	1 to 3 years.	4 to 6 years.	7 to 9 years.	10 to 14 years.
Males	102	32	23	24
Females	107	37	33	27
Positive cases . . .	2	2	2	10
Percentage	1 per cent.	2.9 per cent.	3.6 per cent.	19.6 per cent.

Analyzing my series of cases to see how far the positive Chvostek means tetany, I must conclude that there seems to be no case

among these 16 (nor among the 15 to be described later) in which a positive diagnosis of tetany, present or previous, could be made. In only 2 of the cases (Cases I and XV) could a history of convulsions be obtained. In the one case a girl, aged fifteen years, had had a number of general convulsions when aged eight to nine years, but since then she has had no more. Although she had a marked Chvostek's sign, her electrical reaction to galvanism was normal. Her brother (Case XVI, Table III) also had never been sick, except for his present complaints of nervousness and headache. Both the children showed orthostatic albuminuria.

TABLE II.—Analysis of Thirty-one Positive Cases (Thirteen Males and Eighteen Females).

Case No.	Age (years).	Sex.	Degree of twitching.	Diagnosis.
I	6	M.	3	Hysteria.
II	14	F.	2	Headache.
III	10	F.	1	Headache.
IV	12	F.	1	Neurotic.
V	13	M.	3	Neurotic.
VI	10	F.	1	Neurotic.
VII	12	F.	3	Neurotic.
VIII	12	F.	2	Neurotic.
IX	12	F.	1	Orthostatic albuminuria.
X	13	M.	1	Orthostatic albuminuria.
XI	5	F.	1	Orthostatic albuminuria.
XII	11	F.	3	Orthostatic albuminuria.
XIII	7	F.	2	Orthostatic albuminuria.
XIV	12	F.	2	Orthostatic albuminuria.
XV	15	F.	3	Orthostatic albuminuria.
XVI	13	M.	1	Orthostatic albuminuria.
XVII	11	M.	2	Orthostatic albuminuria.
XVIII	13	F.	3	Orthostatic albuminuria.
XIX	10	M.	2	Orthostatic albuminuria.
XX	11	F.	3	Orthostatic albuminuria.
XXI	13	F.	3	Orthostatic albuminuria.
XXII	6	F.	2	Bronchitis.
XXIII	2	F.	2	Bronchitis.
XXIV	1½	M.	3	Bronchitis.
XXV	9	M.	3	Bronchitis.
XXVI	12	M.	1	Bronchitis.
XXVII	8	F.	1	Hypertrophied tonsils.
XXVIII	9	M.	3	Asthma.
XXIX	12	M.	3	Enuresis.
XXX	14	M.	3	Mitral stenosis.
XXXI	9	M.	3	Cyclic vomiting.

The second case giving a previous history of convulsions (Case I, Table II) was a boy, aged six years, who for a year had been subject to peculiar attacks, resembling Jacksonian epilepsy. Chvostek's sign in his case was also well marked but his electrical reactions were normal, and the diagnosis of late tetany (tetanoid späteklampsie of Thiemich) was therefore ruled out. He showed signs of hysteria, such as temporary deafness, irregular and varying areas of anesthesia, and analgesia and was therefore classed as a

case of hysteria. An interesting observation was made in this case as regards the variability of Chvostek's sign. The child was seen one afternoon and showed a very strongly marked facial phenomenon. A few days later he had convulsions followed by several hours of coma. After regaining consciousness Chvostek's sign could not be obtained. Stoeltzner¹² reports a similar case of the disappearance of the sign directly after a convulsion in an infant suffering from tetany.

Excepting in these 2 cases of convulsions mentioned above no history of any symptoms of tetany, such as laryngismus or carpopedal spasm, could be obtained in any of the cases. In a few children electrical irritability was tested, but no case showed galvanic hyperirritability. It seems fair then to conclude that these cases with the possible exception of Case XXVIII, are not cases of latent tetany.

The next question to be considered is whether these cases showing the positive sign in any way resemble each other; whether they fall into any well-defined group. I think that this can be answered in the affirmative by a consideration of Table II, which shows the diagnosis or chief complaints of children in my own series in whom the sign was positive. It will be noted that there are 15 more cases than in Table I. These were not included in the first table, since they were seen during June, July, and August, three months during which we were not yet in the habit of examining every new case for this symptom. However, these 15 cases will be of use in discussing the type of child in which we find that the positive reaction occurs. The most striking feature is the large number (13) of cases of orthostatic albuminuria. Most of these, as well as the 2 cases classed as headache and the 5 classed as neurotic, the asthmatic, the case of enuresis, and cyclic vomiting, belong to the same clinical group, which has been described by Hamburger,¹³ as children showing the "vasomotor symptom complex." These children are characterized by easily irritated vasomotor systems. Their chief complaints are nervousness, irritability, palpitation, flushing, indefinite pains for which no cause can be found, sometimes vomiting, without apparent reason, and, more rarely, fainting and pseudoanginal attacks. On examination they are usually pale, though their hemoglobin is normal; they have cold, clammy, cyanotic hands; their radial arteries, and frequently their temporals are palpable and sometimes visible, though the blood pressure is low. Their reflexes may be increased or diminished. Their urine often shows albumin, which disappears on lying down, and which usually can be increased by the assumption of a kneeling posture, as described by Jehle.

¹² *Jahrbuch f. Kinderheilkunde*, 1911, No. 6.

¹³ *Munch. med. Woch.*, 1911, No. 42.

The preponderance (23 out of 31 cases) of this type of child fits in well with the conclusions of Hochsinger, and emphasizes the frequency of the presence of Chvostek's sign in nervous children. In these cases this sign seems to me of much more value than the knee-jerk, and its presence in neurotic children appears to be of much more constancy than an increased patellar reflex.

Of the 31 children 6 did not show any other signs of nervousness, 5 having bronchitis and 1 mitral disease. These 6, however, were seen only once or twice. The other 25 all showed distinct neuropathic symptoms, 20 of them, as explained above, belonging to the vasomotor group.

We may conclude, therefore, that:

1. Chvostek's sign is present in 3.2 per cent. of the poor applying for treatment.

2. The sign becomes more frequent the older the child up to 19.6 per cent., at ten to fourteen years of age.

3. The presence of so great a number of positive cases here in America, where tetany is relatively an uncommon disease, is another argument in favor of considering Chvostek's sign in older children as distinct from any connection with tetany.

4. The positive Chvostek in an older child, as a rule, means a neuropathic constitution. It seems especially common in children showing vasomotor irritability, and particularly in those suffering from orthostatic albuminuria.

5. Chvostek's sign is easily elicited, and should be more often used as an adjuvant in making the diagnosis of neuropathic children.

A CLINICAL NOTE ON VERRUCÆ PLANTARES.

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FEW benign lesions of the skin are so troublesome to the patient or so refractory to therapeutic measures as the so-called "papilloma of the sole," or plantar wart. Although Gorju¹ described the condition in 1857, it was not until the publication of Dubreuilh's² classical paper, in 1895, and the careful clinical reports of Eddowes³ in 1896, and of Melchior Robert,⁴ in 1897, that a careful and accurate delineation of the symptomatology of the affection was available.

More recently, D. W. Montgomery⁵ and Bowen⁶ have called

¹ Thèse de Paris, 1857.

² Brit. Jour. Dermat., 1896, p. 193.

³ Jour. Amer. Med. Assoc., July 11, 1903.

⁴ Boston Med. and Surg. Jour., 1907, p. 781.

⁵ Ann. de dermat. et de syph., 1895, p. 441.

⁶ Ann. de dermat. et de syph., 1897, p. 397.